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ABSTRACT

The purpose of this study was to determine if Alaskan Native students approach the classroom with a pattern of learning processes different from that of students from the dominant urban Caucasian culture. Population samples were extracted on the basis of 1,736 tests administered to individuals, aged 8 through 47 years, residing in Alaska. Specific data treated in the study were from students (aged 9-16 years) in 8 schools representing 4 ethnic groups: Caucasian, Negro, Eskimo (Inupik), and Indian (Athabascan). Two hypotheses were tested: (1) that Alaskan Natives (Eskimos, Aleuts, and Indians) possess greater ability than the dominant Caucasian culture to perform tasks associated with perception and visual memory and this greater skill can be measured and interpreted for application to enhance formal learning of students and (2) that the "Squiggle Test" can be administered successfully in the group or classroom setting for the purpose of rapidly identifying individuals with subtle impairments to learning which may otherwise remain undetected and untreated. Support was obtained for both hypotheses tested. Included in the document are conclusions, recommendations for further research, a copy of the Squiggle Test, and statistical tables. (EJ)

ED046549

MONOGRAPH I
Human Environmental Resources
Systems

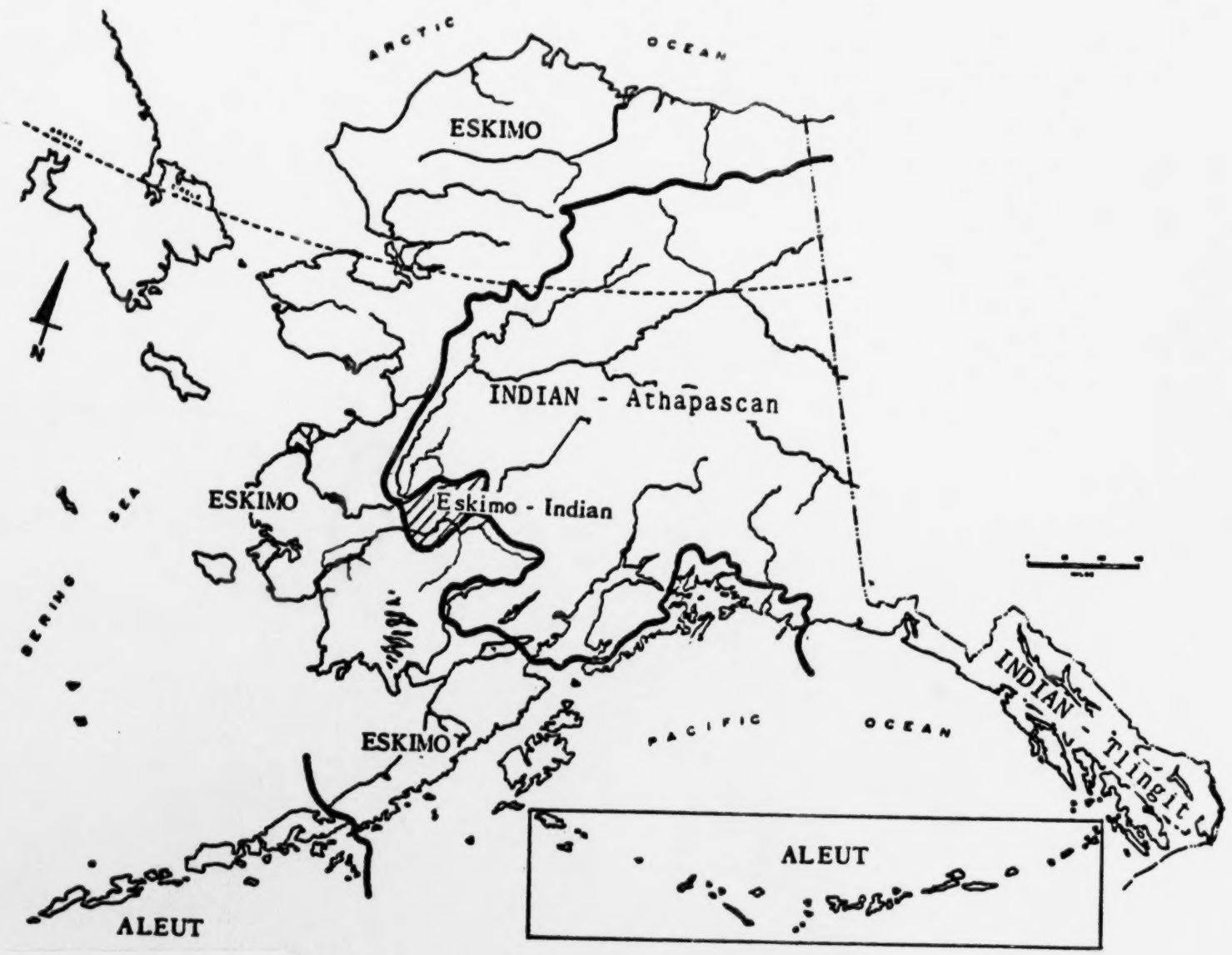
PERCEPTION AND VISUAL MEMORY

of

SCHOOL-AGE ESKIMOS AND ATHABASCAN INDIANS

In

ALASKAN VILLAGES



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by
Laurel L. Bland, B. Ed., M.A.

MAY - 1970

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Monograph I

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F O R E W O R D

In 1967, as a mature adult pursuing an undergraduate degree, it was my privilege to study under Dr. Troy Sullivan, Assistant Professor of Education, University of Alaska Southcentral Regional Center at Anchorage. Dr. Sullivan encouraged my aspirations in educational research and a desire to continue my studies toward a goal intended to contribute something of value to education in rural Alaska - the children of the villages of the Eskimos, Aleuts, and Alaskan Indians. During my work as technical assistant and consultant among the village residents over the next three years, under Dr. Sullivan's guidance, I continued to administer the diagonostic test reported herein whenever the opportunity arose. This material was organized and treated after completion of graduate studies on Campus of the University of Alaska with the encouragement of Dr. Sullivan and Dr. Wendell Wolfe, Dean-College of Behavioral Sciences, University of Alaska.

Decision to publish this material, even through the study covers only two of the major ethnic sub-groups of Alaskan Natives, was for two reasons. One, it is believed that the information is important enough to require its distribution among educators as soon as possible. This will permit others to use the material in developing educational teachniques and media. Two, on the basis of what is reported herein others may be able to secure the financial support to extend the study to the groups not reported.

I wish to express my appreciation to Dr. Wolfe for his support throughout the compilation of this report. I wish to gratefully acknowledge my deep debt to Troy Sullivan for his generous support and assistance for the entire period this independent research was in progress and his contributions to the final manuscript.

I also wish to thank Dr. Judith Kleinfeld, Assistant Professor of Education, Institute of Social, Economic and Government Research - University of Alaska, who verified the reliability of scoring and testing techniques by observing the administration of some of the tests given in the Fairbanks area and by independently scoring 100 randomly selected tests, and for her instruction that provided a deeper understanding of the data in the light of current education theory.

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September 10, 1970

EXPLORATORY RESEARCH IN PERCEPTION AND VISUAL MEMORY AMONG ALASKAN URBAN AND RURAL YOUTH 9 THROUGH 16

by

Laurel L. Bland, B.Ed., M.A.
MAY 1970

I. PURPOSE

Present emphasis upon individualized instruction in the Alaskan schools and the wide disparity between academic achievement recorded for Alaskan Native students and those from the dominant urban Caucasian culture indicate a need to determine if Alaskan Native students approach the classroom with a different pattern of learning processes than those of the other students. The purpose of Part I of this study is to determine if such a difference exists of sufficient significance to require special or adaptive techniques in teaching methodology in order to enhance or expand the learning process of Alaskan Native students in the classroom setting.

The purpose of Part II of this study is to determine if the instrument upon which this report is based (called the Squiggle Test) is a valid and reliable device for rapidly screening groups or classes of students to identify individuals with otherwise undisclosed subtle neurological impair-

ments to learning.

II. HYPOTHESES

Hypothesis I: Alaskan Natives (Eskimos, Aleuts, and Indians) possess a greater ability than the dominant Caucasian culture to perform tasks associated with perception and visual memory; and that this greater skill can be measured and interpreted for application to enhance the formal learning of students.

Hypothesis II: The device known as the "Squiggle Test" can be successfully administered in the group or classroom setting for the purpose of rapidly identifying individuals with subtle impairments to learning that may otherwise remain undetected and untreated.

III. SAMPLE

Population samples included in this study were extracted from a total of 1,736 tests covering individuals residing in Alaska from age 8 through 47 years. The data treated and reported herein was obtained from the following:

A. The entire student body, grades 3 through 9, Point Barrow schools;

B. The entire student body, grades 3 through 10, Fort Yukon schools; **

**(See Addendum)

C. The entire 9th grade enrollment at Ora Dee Clark Junior High, Anchorage;

D. The entire enrollment, grades 3 through 6, Teller school;

E. All Inupik Eskimos enrolled in grade 9 Boarding Home Program, Ryan Junior High, Fairbanks;

F. The entire enrollment, grades 3 through 6, Chena School, Ft. Wainwright;

G. The total 7th grade enrollment, Ft. Wainwright Junior High School; and

H. Heterogeneous classes (1 each) grades 3 through 6, Hunter School, Fairbanks.

The first tests were administered in April 1968, some were given in April 1969 and the majority were administered in April and May, 1970.

Tests were coded by four ethnic groups--Caucasian, Negro, Eskimo (Inupik) and Indian (Kuchin(Athabascan)). When ethnic origin was in doubt, tests were discarded. These included seven Boarding Home students not identified as Eskimo, since it was impossible to determine if origin was Aleut, Athabascan or Yupik Eskimo. One Navahoe Indian student was also excluded. Individuals whose tests indicated gross impairments in the ability to perform the tasks--as indicated by an inability to produce any of the other seven figures used in the test besides the four upon which measurements are based--were also excluded. Five tests were discarded for this reason. Three are Caucasian (age 14-16) one Negro (Age 14-16)and one Eskimo (Age 14-16). Although the data were

not treated at this time, all tests for grades 3 through 6 record the reading level of individuals according to standardized tests. All subjects are additionally recorded by age, grade, sex, school affiliation, and hand and eye dominance. This report covers only age, sex, and ethnic origin as related to performance on the test.

IV. METHOD

The measuring instrument, the Squiggle Test, is reproduced in Table I. General information about the test and its interpretation and application in the classroom is also included. The Table is an adaptation of a test description provided to teachers who have adopted this technique in teaching practice. The entire test was administered to the test groups, with figures 1 through 6 regarded by the testor as "warm-up" practice for the subjects. Inability to reproduce the simple preliminary figures was considered indicative of problems in learning beyond the limits of the purposes for conducting this study. Figure II was successfully completed by all subjects included in the report. It was therefore discarded as redundant.

It is acknowledged that the Squiggle Test may be used by clinicians and educators for interpretative and projective analysis of behavior or capability of individuals. For

purposes of this study, however, the instrument is viewed only as a device to measure visual memory and to identify subtle neural impairments (either physiological or psychological) that may negatively affect learning.

A. Test Administration: All tests were administered by the same individual using the same techniques in each situation. Testing occurred entirely in the ordinary classroom setting. Figures were drawn on a chalkboard, subjects were given time to view each figure (approximately 45 seconds), the figure was erased, and a signal was given to "draw what you saw." Each subject was given a booklet consisting of 11 blank sheets of 8 1/2 x 11" white paper with a cover sheet showing blanks for appropriate personal information. Subjects were instructed to reproduce figures any size they chose, to place them anywhere on the page they wished, and to draw only one figure on a page. Rules for the test included no erasing, using a medium soft lead pencil, and no conversation during testing.

B. Scoring: All subjects included in the study reproduced figures 1 through 6 and number 11 successfully, so these items were excluded from the test items used for measurement of performance. Figures 7, 8, 9, and 10 appearing on Table 1 were assigned numbers 1, 2, 3, and 4 and scored

for this report.

Each figure was given a value of 5 points, and scoring was determined as "right" or "wrong" depending upon the subject's ability to reproduce the figure in a clearly recognizable fashion that included all details of the model. Figure 4, adapted from psychological tests used in Stanford-Benet and Bender-Gestalt psychological testing instruments, is presumed to reflect difficulties with perception and hand-eye coordination. Figure 4 is therefore considered reliable to depict symptoms of neural impairment, regardless of cause. For this reason, the 5 types of common error--including omission--were assigned a 5 point value each in order to score detail within figure 4. (See Table I) Findings and conclusions related to Hypothesis II are primarily based upon the evidence provided by figure 4 data.

C. Reliability: A random selection of 100 tests were independently scored by an experienced educational psychologist* unfamiliar with the instrument or the subjects. Reliability was demonstrated at 86.5% identical scoring with the researcher. Consistency and reliability of test administration was demonstrated by subsequent observation of the administration of the tests on four different occasions by the same individual who validated the scoring. Conclusion

*(See Addendum)

of the evaluator was that 100% consistency was observed.

D. Validity: The Squiggle Test is not a standardized instrument nor did a survey of the literature produce a fully equivalent standardized test for comparison. PSYCHOLOGICAL TESTING, by Anne Anastasi (Macmillan Company, N.Y., 1968) provides ample evidence that the purpose and interpretation of the Squiggle Test as used herein is based upon sound presumptions stemming from the work of recognized authorities in the field of tests and measurements.

E. Validity of combining sub-samples: Maximum cooperation was extended by the schools wherein testing occurred. Whenever ethnicity was in doubt, verification by the teacher or administration was obtained. Eskimo children were tested from three regions, and include children originating from Diomede, Teller, Wales, Shishmaref, Nome, Pt. Hope, Wainwright, Barter Island, Selawik, Noorvik, Noatak, Kotzebue, Barrow, King Island and other villages in the Inupik Eskimo region. Prior to combining Eskimo population sub-samples, the null hypothesis was demonstrated at the one percent level. A similar check was made on the Caucasian samples. The Athabascan Indian subjects were all obtained from a single school. The null hypothesis also held at the one percent level for sex, and therefore boys and girls were combined.

IV. SURVEY OF THE LITERATURE

Apparently little work has been reported in the field of visual memory as it relates to American aboriginal populations. Two references were located, but were not immediately available through local resources. These are "The Influence of Culture on Perception" by Segale, Campbell and Herzkowvince (1966) and "Eskimo Perception" by Carpenter, Varley and Flarrety (1950). Some work has been done concerning visual memory among Negroes--most notably at Harvard University. Since the Negro population in Alaska is extremely limited, and the sample included in this study is insufficient for meaningful treatment, the data obtained are reported, but no conclusions or generalizations are made, nor should any additional use be made of this data.

V. RESULTS

Analysis of variance and covariance is not attempted at this time for two reasons. (1) The importance of the subject, and its implications for the development of educational techniques responsive to new knowledge about learning processes of Alaskan Native students demands the most competent treatment of raw data. In recognition of this importance, further treatment other than the basic analysis presented herein should be performed by a team that includes a qualified

statistician and an experienced educational psychologist.
(2) If the differences in visual memory and a possible differential change in the cognitive process in the 11-13 year age group among the Alaskan Native subjects is as significant as it appears to be in this study, the other three major Alaskan Native ethnic groups (Aleuts, Yupik Eskimos, and Southeastern Indians) must also be included if a discrete profile of a special ability is to be described. Further data needs to be acquired for a comprehensive analysis of the Alaskan Native population before valid generalizations can be made or results of research can be effectively applied.

VI. FINDINGS AND CONCLUSIONS

A. Based upon the evidence of this study, the following conclusions regarding the hypotheses are made:

HYPOTHESIS I: There is an apparent significant difference between the Inupik group of Alaska Eskimos and the dominant population. The Eskimos possess a greater ability to demonstrate visual memory than do the other groups tested. The Athabascan Indians (Kuchin) also possess a greater ability, but not quite to the level of significance as the Eskimos. Data was not available concerning the Aleuts, Yupik Eskimos, or the Southeastern Indians. Therefore, Hypothesis I is accepted for the two groups measured when compared to an

equivalent sample from the dominant society.

HYPOTHESIS II: Except for Group II, excluded because of insufficient data, Groups I and II demonstrated 25% of the total errors made on figure 4, and Group IV made 60% of its errors on the same item. Fifty-five point five percent of Group I made errors in reproducing the four test items, 45.8% of Group III, and 43.2% of Group IV also made errors. These gross findings, together with the ranking of internal detail discrepancies on figure 4, indicate that the Squiggle Test does rapidly identify subtle impairments to perception and hand-eye coordination that may affect the learning process. The high incidence of errors recorded for figure 4 indicates that the Squiggle Test, administered in the group setting, does (1) identify perceptual problems, and can be used as a preliminary screening device prior to additional diagnostic testing, or (2) serve to discern if special remedial attention is needed by individual students. Therefore, Hypothesis II is accepted.

B. The evidence found in this research indicates that a significant difference does exist between the Eskimo population and the dominant society at a minimum level of five percent. Sufficient evidence is reported to indicate the need for further research regarding the differences found among and

within the Alaskan Native population that may affect the learning process in the formal classroom setting. Apparently, Alaskan Eskimos and Athabaskan Indians possess a higher order of visual acuity and retention than that of the other groups measured. Implications of the findings applicable to methods used in education and employment training at all levels are far-reaching and all-encompassing. The evidence suggests that education or training needs to be heavily oriented to demonstration and visual presentation of materials and techniques to be learned. Development of a visually oriented methodology to be applied whenever appropriate can be expected to enhance achievement in basic education for adults, including living skills as incorporated in early childhood education and community school centered educational programs, academic instruction in the formal classroom; and vocational training.

Certain occupational categories can be expected to provide a greater opportunity for successful and personally rewarding experiences when job-training methodology is in keeping with differences in the learning process found among the groups of people being taught. Occupations that suggest a high success factor for those with highly developed visual memory skills would include creative writing, photography, invention based upon existing technology, proofreading in many applications, industrial graphics, occupations associated with the natural

and physical sciences where accurate observation and record keeping is required, and a variety of service occupations requiring careful perception and reproduction of detail such as social and welfare professions and para-professions.

VII. RECOMMENDATIONS FOR FURTHER RESEARCH

A. Exploratory research identical to that reported herein should be completed for the three Alaskan ethnic groups not presently included.

B. Recognizing that a "ceiling" for Alaskan Native subjects may exist for the instrument used in this study, a more sophisticated instrument should be developed and research conducted that will clearly establish levels of visual memory and the retention rate for a broad sample population.

C. Research should be undertaken to define and describe a teaching methodology that recognizes the different or special capabilities of the Alaskan Native student.

D. Additional research focusing upon cognitive differences extant in the Native population related to age and the developmental process should also investigate the relationship, if any, to the linguistic connotations to learning found among the five principal language groups of the Alaskan Native people.

E. Additional research in a controlled setting is needed to correlate academic achievement with skills associated with perception and visual memory. This should be conducted con-

currently with a longitudinal study of teaching methodology oriented toward the dominant culture correlated with a methodology oriented toward learning based upon visual teaching techniques.

F. In order to include all presently known variables related to the study reported herein, additional research should include determination if hand-eye dominance bears any relationship to hand-eye coordination and the ability to reproduce correctly the test items.

TABLE 1

APPROACH TO INDIVIDUALIZED LEARNING BY USE OF THE SQUIGGLES

Outlined by Dr. Troy Sullivan

PURPOSE:

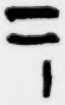
Identification of perception difficulties - may prevent frustration leading to academic or discipline problems.
Continual Evaluation - concepts can be used to interpret writing also.
Pupil Orientation vs Subject Matter - A teacher who must "cover" each page of a series thinks in terms of a class rather than each pupil. Understanding the student's reaction to the squiggles helps change teacher's point of view.
Chalkboard Utilization - Understanding of perception in learning emphasizes visual, auditory, and kinesthetic stimuli.

INTERPRETATION:

Perception - Subject sees you draw figure, stimuli removed - subject draws figure thereby displaying mental imagery, hand-eye coordination, spacial orientation, emotional involvement, and phonics readiness.
Emotions - if subjects use only #2 pencil, then evaluator of drawings will gain insight into variations of pressure; heavy pressure usually indicative of boldness, frustration or aggressiveness; light pressure may indicate timidity, withdrawal, insecurity or need of positive rewards. Size of drawing; small often indicative of small self image; large usually indicates outgoing behavior patterns.
Figures - Draw, then remove; watch subject draw (M. A. = mental age regarding coordination affecting reading skills)

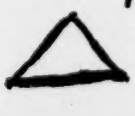
Fig 1

M.A. 3 - circle closure, size similar to model

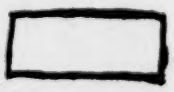


M.A. 4 - developmental tasks of parallel lines, horizontal and vertical coordinated to form box-- note left to right and top to bottom patterns regarding reversal and inversion tendencies.

Fig 2

Fig 3 

MA. 5 - cross body coordination of diagonal lines - note closure of corners and isimetry.

Fig 4 

M. A. 6 - indicates readiness level - remembers whole sentence and at sight vocabulary building stage - parallel lines in unequal pairs, note left-right orientation.

Fig 5

M. A. 7 - Reading Level - can identify sight words in new context - note closure of lower apex, length of sides.

Fig 6

M. A. 8 - Phonic Level - abstract symbols mastered, can concentrate on sound and meaning of words. Symptoms of immaturity - cannot easily compose words from abstract sounds.

Fig 7

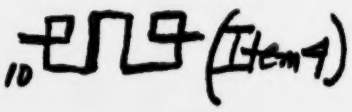
Test (Item 1)

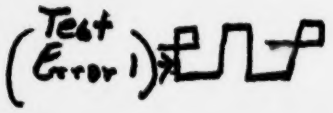
M. A. 9 - = spacial disorientation - subject sees overall shape of word, misses internal detail - kinesthetic approach helpful in spelling, writing and thus reading. (Anything he can write, he can read.)

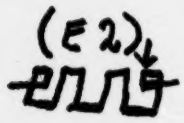
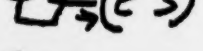
Fig 8 (Item 2) M. A. 10 - = slight interference

= gross interference

Fig 9 (Item 3) M. A. 11 - semicircle indicates mastery of continual change and control of coordination.

Fig 10  (Item 4) M. A. 12 - sensitive to reversal and cross dominancy in youth or adults. Variations indicate need for determining unilaterality. (Hand with tube to eye, etc.)

(Test Error 1)  = mild interference often with reversals and misdirections- subject may be unaware of condition.

(E 2)   (E 3) = gross interference, often organic, subject usually aware and emotionally concerned - <u>kinesthetic</u> approach helps regain confidence.

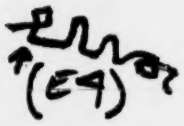
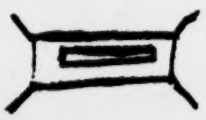
 (E4) (E5) → Omit

Fig 11 M. A. 13 - Three-dimensional representation.

 = gross interference.

IMPLEMENTATION:

<u>Confidence factor</u> - by use of tracing techniques, subject can receive positive reward using large words; ex: carpenter, helicopter, sphygmomanometer, etc.

<u>Individual Curriculum</u>

Experience Charts
Study Centers
Reading Level Mobility
AV - tapes, viewers, listening labs, language masters, etc.
Student Access to Teacher
Student word collections - whisper, write, erase, observe, evaluate
Grading per individual vs class

Transition from "Teacher" to "Coordinator of Learning". This philosophy permits the teacher to utilize all skills and techniques she may possess. It permits a change in orientation toward the needs of each pupil and a corresponding flexibility of classroom procedures.

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DISTRIBUTION OF SCORES

DISTRIBUTION OF SCORES BY SAMPLE POPULATION												
	GROUPS				MEAN SCORES				STANDARD DEVIATION			
AGE	N I	N II	N III	N IV	I	II	III	IV	I	II	III	IV
9-10	87	14	29	41	11.95	7.50	12.06	16.70	6.35	6.19	5.99	4.76
11-13	113	16	37	45	15.26	12.50	15.40	15.77	7.20	5.88	5.10	4.80
14-16	301	19	29	39	15.79	11.58	17.07	17.69	5.10	6.68	4.59	3.40
TOTAL 770	501	49	95	125	15.0	12.8	14.9	16.7	5.7	6.6	5.9	4.7

GROUP I CAUCAUSIAN
II NEGRO
III ATHABASCAN
IV ESKIMO (INUPIK)

PERCENT OF PERFECT SCORES				
AGE	G I	G II	G III	G IV
9-10	21.8%	7.1%	20.7%	56.1%
11-13	43.3	25.0	48.6	46.6
14-16	51.4	26.3	65.5	69.2
TOTAL	44.5%	20.4%	45.2%	56.8%

GROUP I - CAUCASIAN

GROUP I - CAUCASIAN DISTRIBUTION OF SCORES												
				FIGURES				TYPES				
N	AGE	PERFECT SCORES	TOTAL MISSED	NUMBER MISSED RIGHT/WRONG				DETAIL MISSED FIGURE 4				
43	9	9	94	19	24	29	22	18	2	1	1	0
44	10	10	61	9	16	19	17	12	0	4	1	0
31	11	9	50	7	10	17	16	14	1	1	0	0
23	12	8	23	4	6	9	4	3	0	1	0	0
59	13	32	23	6	5	6	6	5	0	1	0	0
235	14	124	184	22	58	65	39	24	4	5	6	0
54	15	26	50	8	9	17	16	9	3	2	1	1
12	16	5	14	1	4	5	4	2	2	0	0	0
TOTAL 501		223	499	76	132	167	124	87	12	15	9	1

AGE 9-10 50 boys 37 girls		
SCORE	CASES N	SCORED X
0	8	0
5	17	85
10	14	140
15	29	435
20	19	380
	87	1040
$\bar{X}$ 11.95 s 6.35		

AGE 11-13 65 boys 48 girls		
SCORE	CASES N	SCORED X
0	2	0
5	7	35
10	23	230
15	32	480
20	49	980
	113	1725
$\bar{X}$ 15.26 s 7.20		

AGE 14-16 163 boys 138 girls		
SCORE	CASES N	SCORED X
0	3	0
5	22	110
10	54	540
15	67	1005
20	155	3100
	301	4755
$\bar{X}$ 15.79 s 5.0		

TOTAL 278 boys 223 girls		
SCORE	CASES N	SCORED X
0	13	0
5	46	230
10	91	910
15	128	1920
20	223	4460
	501	7520
$\bar{X}$ 15.00 s 5.72		

SCORE POSSIBLE @ 5 pts. ea.	10020
Points earned	7520
Points lost	2495

GROUP II - NEGRO

GROUP II - NEGRO DISTRIBUTION OF SCORES												
				FIGURES NUMBER MISSED RIGHT/WRONG				TYPES DETAIL MISSED FIGURE 4				
N	AGE	PERFECT SCORES	TOTAL MISSED	1/2	2/5	3/6	4/4	1/4	2/0	3/0	4/0	5/0
8	9	0	17	2	5	6	4	4	0	0	0	0
6	10	1	16	4	4	4	4	1	2	1	0	0
10	11	2	16	2	6	7	1	1	0	0	0	0
1	12	0	2	0	1	1	0	0	0	0	0	0
5	13	2	8	2	2	2	2	2	0	0	0	0
17	14	4	29	7	9	9	4	2	2	0	0	0
1	15	0	3	1	1	1	0	0	0	0	0	0
1	16	1	0	0	0	0	0	0	0	0	0	0
TOTAL 49		10	91	18	28	30	15	10	4	1	0	0

AGE 9-10 — 7 boys, 7 girls		
SCORE	CASES N	SCORED X
0	3	0
5	6	30
10	1	10
15	3	45
20	1	20
	14	105

$\bar{X}$ 7.50 s 6.19

AGE 11-13 — 7 boys, 9 girls		
SCORE	CASES N	SCORED X
0	1	0
5	2	10
10	5	50
15	4	60
20	4	80
	16	200

$\bar{X}$ 12.50 s 5.88

AGE 14-16 — 11 boys, 8 girls		
SCORE	CASES N	SCORED X
0	2	0
5	4	20
10	4	40
15	4	60
20	5	100
	19	220

$\bar{X}$ 11.58 s 6.68

TOTAL — 25 boys, 24 girls		
SCORE	CASES N	SCORED X
0	6	0
5	12	60
10	10	100
15	11	165
20	10	200
	49	525

$\bar{X}$ 12.75 s 6.68

SCORE POSSIBLE @ 5 pts. ea.	980
Points earned	525
Points lost	455

GROUP III - AIHABASCAN

GROUP-III - ATHABASCAN DISTRIBUTION OF SCORES													
N	AGE	PERFECT SCORES	TOTAL MISSED	FIGURES NUMBER MISSED RIGHT/WRONG				TYPES DETAIL MISSED FIGURE 4					
				1	2	3	4	1	2	3	4	5	
				4	7	8	2	0	1	0	1	0	
13	9	2	21	4	7	8	2	0	1	0	1	0	
16	10	4	21	3	4	7	7	4	2	1	0	0	
13	11	6	13	0	3	5	5	3	1	0	1	0	
13	12	7	12	1	3	4	4	4	0	0	0	0	
11	13	5	10	1	2	5	2	1	0	1	0	0	
13	14	7	10	2	2	3	3	2	0	1	0	0	
11	15	8	9	1	3	5	0	0	0	0	0	0	
5	16	4	1	0	0	0	1	1	0	0	0	0	
TOTAL 95		43	97	12	24	37	24	15	4	3	2	0	

AGE 9-10
17 boys 12 girls

SCORE	CASES N	SCORED X
0	2	0
5	5	25
10	7	70
15	9	135
20	6	120
	29	350

$\bar{X}$ 12.06 s 5.99

AGE 11-13
21 boys 16 girls

SCORE	CASES N	SCORED X
0	0	0
5	3	15
10	9	90
15	7	105
20	18	360
	37	570

$\bar{X}$ 15.40 s 5.10

AGE 14-16
18 boys 11 girls

SCORE	CASES N	SCORED X
0	0	0
5	2	10
10	3	30
15	5	75
20	19	380
	29	495

$\bar{X}$ 17.07 s 4.59

TOTAL
56 boys 39 girls

SCORES	CASES N	SCORED X
0	2	0
5	10	50
10	19	190
15	21	315
20	43	860
	95	1415

$\bar{X}$ 14.90 s 5.88

SCORE POSSIBLE @ 5 pts. ea.	1900
Points earned	1415
Points lost	485

GROUP IV - ESKIMO

GROUP IV - ESKIMO DISTRIBUTION OF SCORES												
N	AGE	PERFECT SCORES	TOTAL MISSED	FIGURES NUMBER MISSED RIGHT/WRONG				TYPES DETAIL MISSED FIGURE 4				
				1/1	2/2	3/2	4/8	1/4	2/0	3/1	4/3	5/0
24	9	14	13	1	2	2	8	4	0	1	3	0
17	10	9	24	1	6	8	9	5	0	2	2	0
17	11	5	9	1	3	2	3	2	0	0	1	0
18	12	10	18	0	8	5	5	4	1	0	0	0
10	13	6	5	0	2	2	1	1	0	0	0	0
8	14	5	1	0	0	1	0	0	0	0	0	0
21	15	16	7	0	1	3	3	3	0	0	0	0
8	16	6	6	1	1	1	3	2	0	1	0	0
TOTAL 125		71	83	4	23	24	32	21	1	4	6	0

AGE 9-10		
23 boys		18 girls
SCORE	CASES N	SCORED X
0	1	0
5	1	5
10	4	40
15	12	180
20	23	460
	41	685
$\bar{X}$ 16.70 s4.76		

AGE 11-13		
27 boys		18 girls
SCORE	CASES N	SCORED X
0	0	0
5	4	20
10	6	60
15	14	210
20	21	420
	45	710
$\bar{X}$ 15.77 s 4.80		

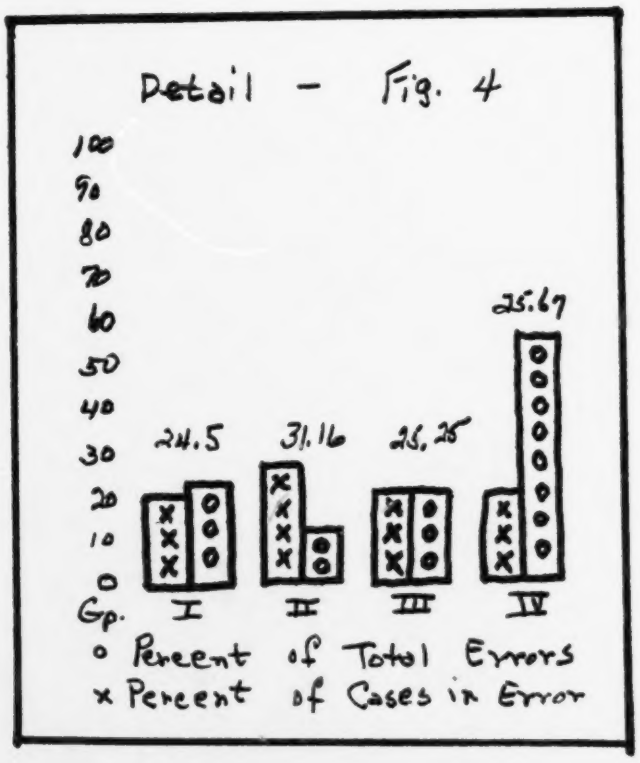
AGE 14-16		
12 boys		27 girls
SCORE	CASES N	SCORED X
0	1	0
5	1	5
10	1	10
15	9	135
20	27	540
	39	690
$\bar{X}$ 17.69 s 3.40		

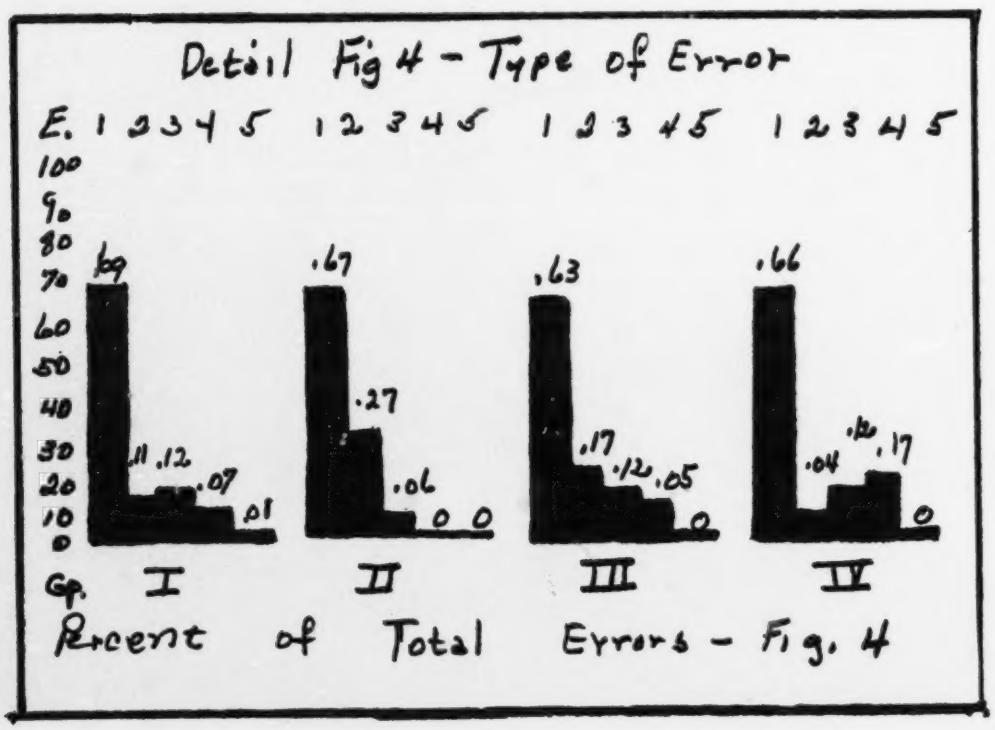
TOTAL		
62 boys		63 girls
SCORED	CASES N	SCORED X
0	2	0
5	6	50
10	11	110
15	35	525
20	71	1420
	125	2085
$\bar{X}$ 16.70 s 4.68		

SCORE POSSIBLE @ 5 pts. ea.	2500
Points earned	2085
Points lost	415

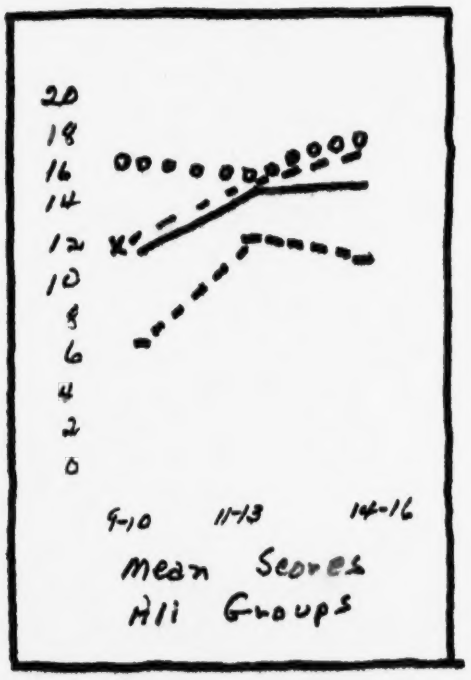
TYPES OF ERROR WITHIN FIGURE 4
PERCENT OF ERRORS WITHIN AND BETWEEN CASES
BY POPULATION SAMPLES

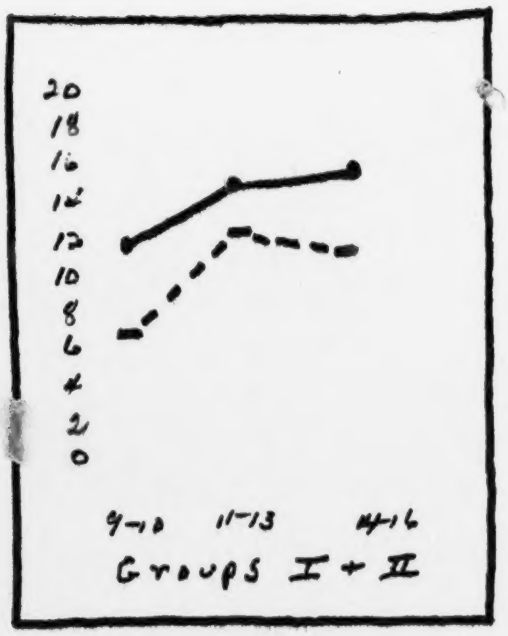
TYPES OF DETAIL ERROR - FIGURE 4							
GROUP	TYPE 1	TYPE 2	TYPE 3	TYPE 4	TYPE 5	No. Cses Wrong Fig. 4	% of Total Errors Made
I	69%	11%	12%	7%	.8%	24%	25%
II	67	27	6	0	0	31	16
III	63	17	12	8	0	25	25
IV	66	4	12	17	0	25	67

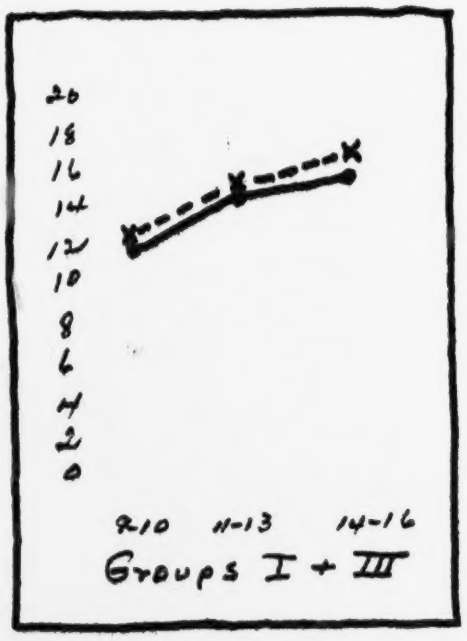


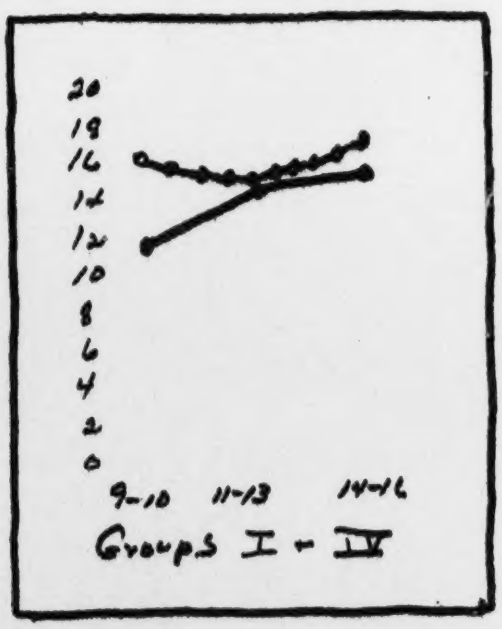


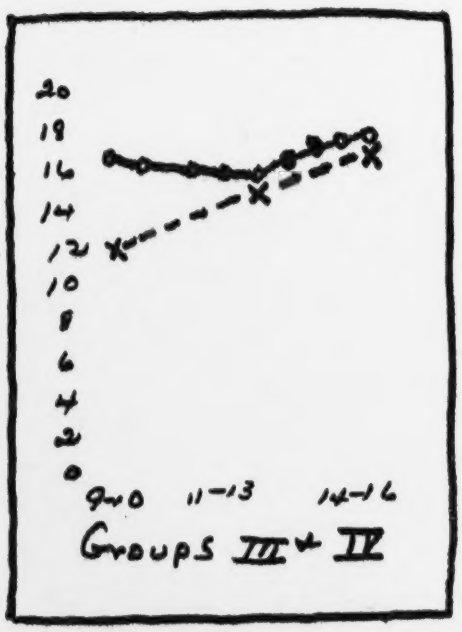
MEAN SCORES - SAMPLE POPULATION
by
AGE GROUPS



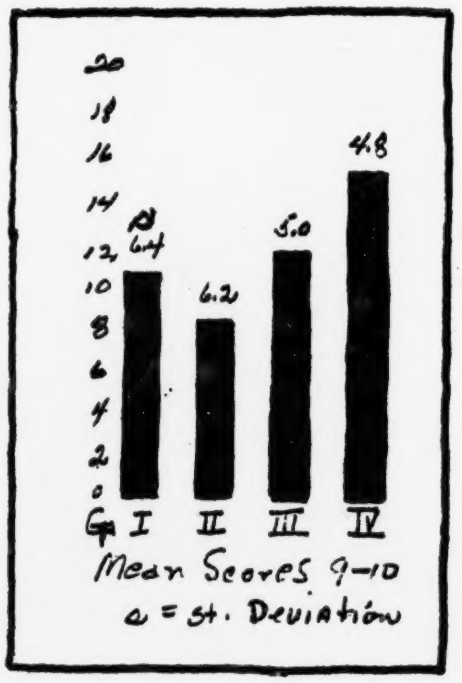


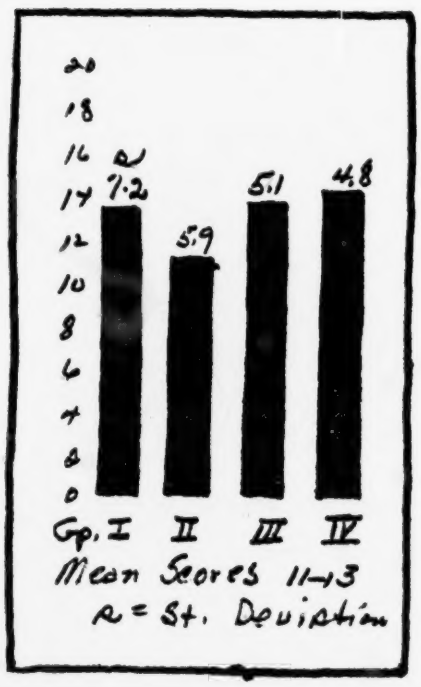


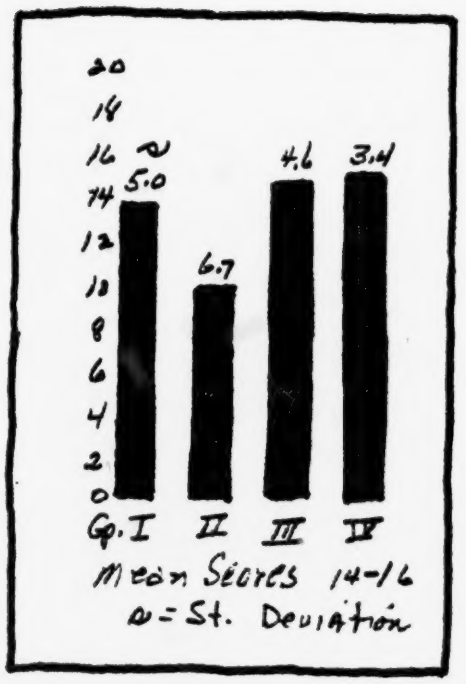




MEAN SCORES
of
SAMPLE POPULATION

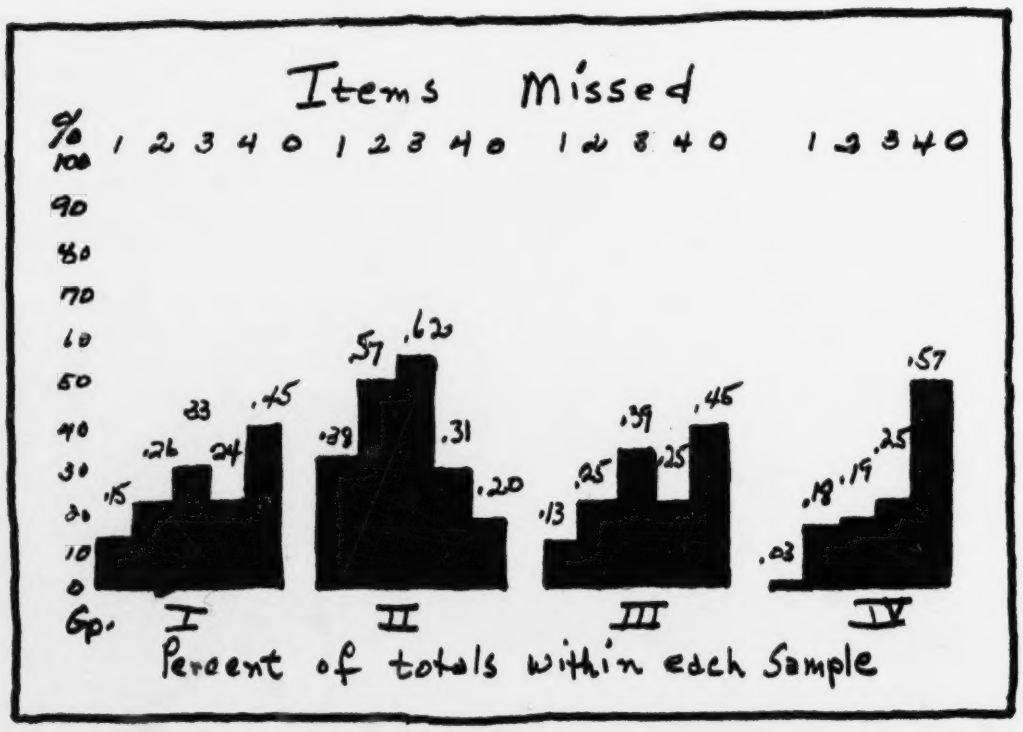






PERCENT OF RIGHT/WRONG FIGURES

ITEMIZED WITHIN SAMPLE POPULATIONS



ADDENDUM

RESEARCH NOTES

1. Reference: Sample population from the Barrow school - age 13 to 16. From a memorandum dated May 20, 1970 from James Hughes, Superintendent:

> "Barrow school enrollment figures show that the present 9th grade class has 34 Native students. This class started as 6th graders with a total of 41 Natives. Three have transferred to other areas, 1 joined the Army, and 3 either dropped out or were committed for criminal offenses."

2. Reference: Squiggle Test. This test has evolved through the efforts of a number of educators concerned with research in the learning process and the causes of learning impairment. It has received considerable attention in Alaska through the introduction and instruction in its administration and application by Dr. Troy Sullivan, Associate Professor of Education, University of Alaska.

3. Reference: Language groups. The Eskimos tested all originate from a region where the Inupik language is spoken. Although Inupik and Yupik (the other major Eskimo language) are mutually unintelligible, the patterns and structures of the languages are considered very much alike. The Athabaskan Indians are from the Kuchin language group. The Southeastern

Indians and Aleuts belong to language groups considered to be as different from the other groups as those of Kuchin and Inupik.

4.* Reliability of practice and procedure used by the researcher was provided by Dr. Judith Kleinfeld, Educational Psychologist, of the Institute of Social, Economic, and Government Research, University of Alaska.

5.** Note: Group III - age 9-11

This sample is not considered to be a fully random selection. FtYukon is a school "center" for the area. Some youngsters may be included from nearby villages who are at Ft. Yukon to receive special attention for learning handicaps.